Original paper

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A comparison of the usefulness of selected neuropathic pain scales in patients with chronic pain syndromes: a short communication

Abstract

The aim of the study was to compare the usefulness of selected neuropathic pain scales in the diagnosis and monitoring of pain in patients with cancer and non-cancer pain syndromes.

62 patients with symptoms of chronic pain were enrolled in to the study. Following a routine medical examination (interview and physical examination) the patients together with the investigators completed four (DN4, PainDETECT, LANSS, MPQ). In addition, all the patients were examined using von Frey filaments to confirm the presence or absence of allodynia.

Neuropathic pain was diagnosed using the scales in a total of 39 patients (62.9%). In addition, examination with von Frey filaments revealed hyperalgesia in 50%, hypoaesthesia in 30.95% and allodynia in 27% of the patients.

The DN4 scale turned out to be the most sensitive (confirming neuropathic pain in 78.5% of all the study patients) and the LANSS scale turned out to be the least sensitive (confirming neuropathic pain in 48.49% of all the study patients).

Key words: cancer and non-cancer pain, chronic pain, neuropathic pain scales, allodynia

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Introduction

According to the new proposal, neuropathic pain is defined as pain arising as a direct consequence of a lesion or disease affecting the somatosensory system [1]. It is clear that neuropathic pain is not a single disease but represents a syndrome, i.e. a constellation of specific symptoms and signs with multiple potential aetiologies. The lack of agreed definitions and specific diagnostic tools for neuropathic pain hamper epidemiological studies and a grading system for neuropathic pain has been proposed: definite, probable and possible neuropathic pain [2].

Probable neuropathic pain is observed in mixed pain syndromes, e.g. failed back surgery syndrome (FBSS), or in cancer patients, and an accurate neurological history and neurological examination, including sensory testing, is most important for establishing the diagnosis and postulating the presence of a neuropathic pain syndrome.

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Several neuropathic pain scales are used to diagnose neuropathic pain [1]:

— the DN4 (Douleur Neuropathique en Questions) questionnaire consisting of seven items related to symptoms and three related to clinical examination [3];
— the PainDETECT Questionnaire, which was developed and validated in German and is available in several other languages. It is a self-report questionnaire with nine items [4];
— the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) questionnaire consisting of five symptom items and two clinical examination items [5];
— the Neuropathic Pain Questionnaire (NPQ) consisting of 12 items (ten sensory and two affective) [6].

The spectrum of neuropathic pain ranges from obvious conditions such as post-amputation pain, painful neuropathies, myelopathies, multiple sclerosis, trigeminal neuralgia, postherpetic neuralgia (PHN), poststroke central pain, to pain conditions with indistinct signs of nerve damage, such as low back pain or pain due to cancer infiltration.

Neuropathic pain in cancer patients may result from the growth of the tumour within the structures of the cerebral nerves and plexuses or from the infiltration of subarachnoid space structures by the tumour. Radiculopathies or mononeuropathies may also develop as a result of infiltration by the tumour or cancer treatment (radiotherapy, chemotherapy, surgery — persistent postoperative pain), but may have also "benign origin". Most of nerve compression pain, seen as mononeuropathies have benign origin.

Nerve dysfunction may results in numbness, weakness and a loss of deep tendon reflexes in the affected nerve area. It may also cause symptoms of spontaneous and stimulus-evoked pain. Spontaneous pain (continuous or intermittent) is often described as burning, shooting or electric shock-like. Stimulus-evoked pain includes allodynia (pain in response to a non-nociceptive stimulus) and hyperalgesia (excessive pain evoked by a nociceptive stimulus).

Many simple methods have been described that may be used to evaluate the severity of pain, all of which are based on patient-reported rating on an appropriate scale. They are used for determining the severity of pain at presentation and during treatment and for comparing the efficacy of treatments and differentiate the specific effect from the placebo effect [7].

The aim of our study was to compare the usefulness of selected neuropathic pain scales in the diagnosis and monitoring of pain in patients with cancer and non-cancer pain syndromes.

Material and methods

We enrolled 62 patients (31 women and 31 men aged from 38 to 84 years) hospitalised at the Pain Management and Palliative Care Unit of the Department of Internal Diseases and Gerontology, The Jagiellonian University Medical College, Krakow, Poland, between 1 January and 31 December 2009. Symptoms of chronic pain were the inclusion criterion. The absence of chronic pain and poor general condition interfering with the completion of neuropathic pain questionnaires were the exclusion criteria.

Following a routine medical examination (interview and physical examination) and obtaining informed consent the patients together with the investigators completed four neuropathic pain scales.

The DN4 scale [3]

Based on an interview the investigator obtained information on pain symptoms, i.e. on the presence of absence of the following specific symptoms:

— burning;
— painful cold;
— electric shock;
— tingling;
— pins and needles;
— numbness;
— itching;
— hypoaesthesia to touch;
— hypoaesthesia to pinprick;
— pain caused or increased by brushing.

The presence of four or more of the above symptoms, as confirmed by four positive answers, qualified the patient for the diagnosis of neuropathic pain.

The PainDETECT scale [4]

The following were rated:

— current, average and maximum severity of pain in the past month on a visual analogue scale (VAS);
— nature of chronic pain;
— severity of burning sensation;
— severity of tingling sensation;
— severity of electric shock-like pain;
— severity of numbness;
— severity of pain resulting from temperature changes;
— severity of pain to touch (e.g. with fingers).

The severity of the above symptoms was rated by the patient as follows: "never", "hardly noticed", "slightly", "moderately", "strongly", "very strongly".

Each answer was assigned a score and then the total score was calculated, which justified a positive, doubtful or negative qualification to the group of patients with neuropathic pain.

The LANSS scale [5]

The patient answered "yes" or "no" to the following questions:

— whether the pain feels like burning, tingling, pricking like pins, needles?
— whether the skin looks different to normal as a result of the pain?
— whether the patient experiences excessive sensitivity to touch?
— whether the pain comes on suddenly and is bursting without an apparent cause?
— whether the pain causes abnormal change in the skin temperature ?
— assessment of sensitivity for allodynia?
— assessment of sensitivity using von Frey filaments Nos. 13–19.

The answers were scored and summed up and if the total score was 12 or higher, a positive diagnosis of the neuropathic mechanism of pain was established.

The NPQ [6]

The Neuropathic Pain Questionnaire (NPQ) allows the patient to very accurately rate the most common qualities of pain on a percentage scale (0–100), where "0" refers to the absence of a specific quality of pain and "100" to the most highest imaginable severity of a specific quality of pain. The following parameters were being assessed:

— severity of burning pain;
— severity of hypersensitivity to touch;
— severity of "shooting pain";
— severity of numbness;
— severity of electric shock-like pain;
— severity of tingling and itching pain;
— severity of itching pain;
— severity of freezing pain;
— how unpleasant the pain is;
— how widespread the pain is;
— sensitivity of the skin to touch;
— whether the symptoms are weather-related.

The elicited pain parameters in terms of percentage scores were multiplied by certain constants, the results were summed up and a constant of 1.408 was subtracted. The result qualified the patient for the diagnosis of neuropathic pain if its value was above zero. A negative value suggested the absence of a neuropathic pain component.

In addition, all the patients were examined using von Frey filaments to assess the changes in touch perception within the painful skin areas compared to non-painful areas and to confirm the presence of absence of allodynia [8]. Depending on the severity of pain we used sizes 13 to 19 filaments and evaluated whether the prickling sensation in these various skin areas was the same or whether it was increased or decreased. The location of pain was graphically marked on a human silhouette sketch.

In the study we:

1. Assessed the most common manifestations of neuropathic pain.
2. Compared the results of examination of sensation using von Frey filaments in patients with and without cancer.
3. Assessed the presence of neuropathic pain in patients with and without cancer on individual neuropathic pain scales.
4. Assessed correlations between the individual scales in individual patient groups in terms of assessment of the occurrence of neuropathic pain in patients with and without cancer.

Statistical analysis

The results were analysed using the Pearson chi-square and the U Mann-Whitney tests.

Results

A total of 62 patients participated in the study. The mean age was 61 ± 10.2 years. Thirty-three percent of the patients had pain caused by failed back surgery syndrome (FBSS) or non-cancer low back pain, 11% had pain resulting from trigeminal nerve neuralgia and 8% had pain accompanying postherpetic neuralgia, limb ischaemia, diabetic neuropathy etc. The remaining 48% of the patients had cancer pain.

The most common manifestation of neuropathic pain in the study group was tingling sensation, followed by prickling sensation and numbness. Allodynia was observed in 27% of the patients (Table 1).

In addition, examination with von Frey filaments revealed hyperalgesia in 50% and hypoaesthesia in 31% of the patients.

Neuropathic pain was diagnosed using the scales in a total of 39 patients (62.9%), although it should be emphasised that depending on the scale used the incidence of neuropathic pain ranged from 48.4% (according to the LANSS scale) to 78.5% (according to the DN4) (Table 2).

Table 1. The incidence of manifestations typical of neuropathic pain

Manifestation	Patients with non-cancer pain	Patients with cancer pain	Total
Pins and needles	71.9%	63.3%	67.7%
Prickling	71.9%	56. 7%	64.5%
Numbness	56.3%	73,3%	64.5%
Burning	65.6%	60%	62.9%
Decreased sensitivity to touch	53.1%	40%	46.8%
Electric shock-like sensation	62.5%	26.7%	45.2%
Pain on brushing	50%	33.3%	41.9%
Decreased stabbing pain	46.9%	23.3%	35.5%
Cold	25%	40%	32.3%
Itching	34.4%	26.7%	30.7%
Allodynia	34.4%	20%	27.4%

Table 2. Patients with or without neuropathic pain according to the individual neuropathic pain scales

Neuropathic pain scale	Patients with neuropathic pain	Patients without neuropathic pain
DN4	47 (78.5% of all the patients)	15 (24.2% of all the patients)
PainDETECT	34 (54.8% of all the patients)	38 (45.2% of all the patients)
NPQ	43 (70.5% of all the patients)	24 (29.5% of all the patients)
LANSS	30 (48.4% of all the patients)	32 (51.6% of all the patients)

Table 3. Correlations defining consistency between the individual neuropathic pain scales in terms of the presence of neuropathic pain in the study group

	DN4	PainDETECT	NPQ	LANSS
DN4	–	p = 0.0021	p = 0.00028	p = 0.00002
PainDETECT	p = 0.0021	–	p = 0.0001	p = 0.00001
NPQ	p = 0.00028	p = 0.0001	–	p = 0.0012
LANSS	p = 0.00002	p = 0.00001	p = 0.0012	–

We showed statistically significant correlations confirming the consistency of our results of assessment of neuropathic pain incidence between the employed neuropathic pain scales in the study group of patients (Table 3).

Conclusion

The International Association for the Study of Pain (IASP) and various researchers have attempted to find an answer to the following question: "Can pain be more or less neuropathic?". A correct definition of neuropathic pain has been considered and whether there can exist pure neuropathic pain (e.g. in postherpetic neuralgia, following stroke). Attempts have been made to establish the clinical criteria for neuropathic pain and to approximate the components of neuropathic pain in mixed pain, such as lumboradicular pain, post-traumatic pain, persistent postoperative pain [7, 9].

In 1991 the British press estimated the incidence of neuropathic pain at 1% in the entire UK population. The S-LANSS scale has recently been used in the UK by posting it to 6000 randomly selected patients of general practices. Neuropathic pain was found to be present in 8.2% of the cases and in 17% of patients with chronic pain, more often in women, elderly and respondents characterised by a lower socioeconomic status [15–17].

It should be assumed that in connection with the ageing of the societies on the one hand and the progress in medicine on the other patients with

cancer, diabetes mellitus or AIDS will live longer and that the number of patients with neuropathic pain will therefore rise.

Neuropathic pain encompasses many pain syndromes associated with injury to the central and/or peripheral nervous systems. This also applies to cancer patients with respect to whom inconsistent data regarding the incidence of neuropathic pain are reported [18, 19].

The most important reason for these inconsistencies is the lack of sufficiently sensitive tools for the assessment of neuropathic pain. Several scales have been described and we assessed the value and usefulness of four of them because literature sources report varying usefulness of the individual scales [1].

The DN4 scale is easy to administer and is characterised by a sensitivity of 83% and a specificity of 90% compared to the clinical diagnosis.

The painDETECT scale is also easy to administer, enables the diagnosis of neuropathic pain in 83% of the patients and is characterised by a sensitivity of 85% and a specificity of 80% compared to the clinical diagnosis.

The LANSS scale is easy to interpret and is characterised by a sensitivity in the range of 82–91% and a specificity in the range of 80–94% compared to the clinical diagnosis.

The NPQ scale is time-consuming in terms of conversion of the raw results given as percentages. This scale, in our opinion, is very valuable, although it is useless in everyday medical practice and is characterised by a sensitivity of 66% and a specificity of 74% compared to the clinical diagnosis.

We diagnosed neuropathic pain in 62.91% of our study patients. As the diagnostic criterion we adopted positive results confirming the presence of neuropathic pain by at least three out of four neuropathic pain scales. The DN4 scale turned out to be the most sensitive (confirming neuropathic pain in 78.5% of all the study patients) and the LANSS scale turned out to be the least sensitive (confirming neuropathic pain in 48.49% of all the study patients), although according to the literature, all these scales enable the diagnosis of neuropathic pain in 75–80% of the patients (Bouhassira et al., 2004; Krause and Backonja, 2003).

In addition, neuropathic pain scales enable the unification of neuropathic pain criteria and diagnosis, which rises the likelihood of correct treatment, which is why it would extremely helpful in everyday medical practice, both for the patient and for the doctor, to analyse the reliability of the scales used in our study and to develop a universal scale for the diagnosis of neuropathic pain based on our results.

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